



BIOLOGICAL RESOURCES
IN THE
TRUTH OR CONSEQUENCES
STUDY AREA

U.S. Fish and Wildlife Service

May 1982

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Introduction

The purpose of the Truth or Consequences Flood Control Project is to protect the Cities of Truth or Consequences and Williamsburg from flash floods originating in the watershed below Elephant Butte Dam. The Corps of Engineers is in the initial stages of plan formulation which should result in a Reconnaissance Report this year. This report precedes formal written alternatives. This project encompasses the watershed in Cuchillo Negro Arroyo, Mescal Arroyo and the Rio Grande through the two cities. The location of the project area is shown in Figure 1.

This letter summarizes the biological resources in the project area which completes Modification No. 1 to the Memorandum of Agreement between the Corps of Engineers and the Fish and Wildlife Service. Vegetation, wildlife and fish data are essential to analyze the environmental impacts of the project. The impacts cannot be predicted unless the species in the area are known. Furthermore, important species should be identified so that appropriate action can be taken in project design. Our studies were designed to determine the most abundant species and habitat preferences of wildlife.

Methods

Vegetation, wildlife and fish information was gathered through literature searches and field surveys. Agencies which supplied data and advice on field inventory methods included the Bureau of Land Management, Soil Conservation Service, Forest Service, New Mexico Department of Game and Fish, and the Bureau of Reclamation. Field studies were conducted from April through August 1981. Data gathering and report writing were provided by: Brian Hanson, Diane Gallegos, Sylvia Romero, Alex Puglisi, Lori Ballinger, Anita Culp, Maureen Long, Alan Fisher, Wendy Brown, Greg Sanchez, Tommy Gallegos, Samuel Lovato, and Roma Montoya.

A habitat map was developed from information furnished by the Bureau of Land Management in Las Cruces, Gila National Forest in Silver City and our vegetation typing. Ground reconnaissance was used to type the habitats where no typing had been done and to interpret habitats used by the different agencies. An airplane was used where ground reconnaissance was inadequate.

Field studies were conducted to determine the most abundant plants, small mammals, birds, reptiles, and fish. The locations of the specific study sites are shown in Figure 2. Plant data were collected using the 50 point line intercept method, 20 tree method and width measurements. Small mammal data were collected using live traps and snap traps. Bird data were collected using counts from a boat and walking strip count. Reptile data were collected using traps and a walking strip count. Fish data were collected using an electroshocker.

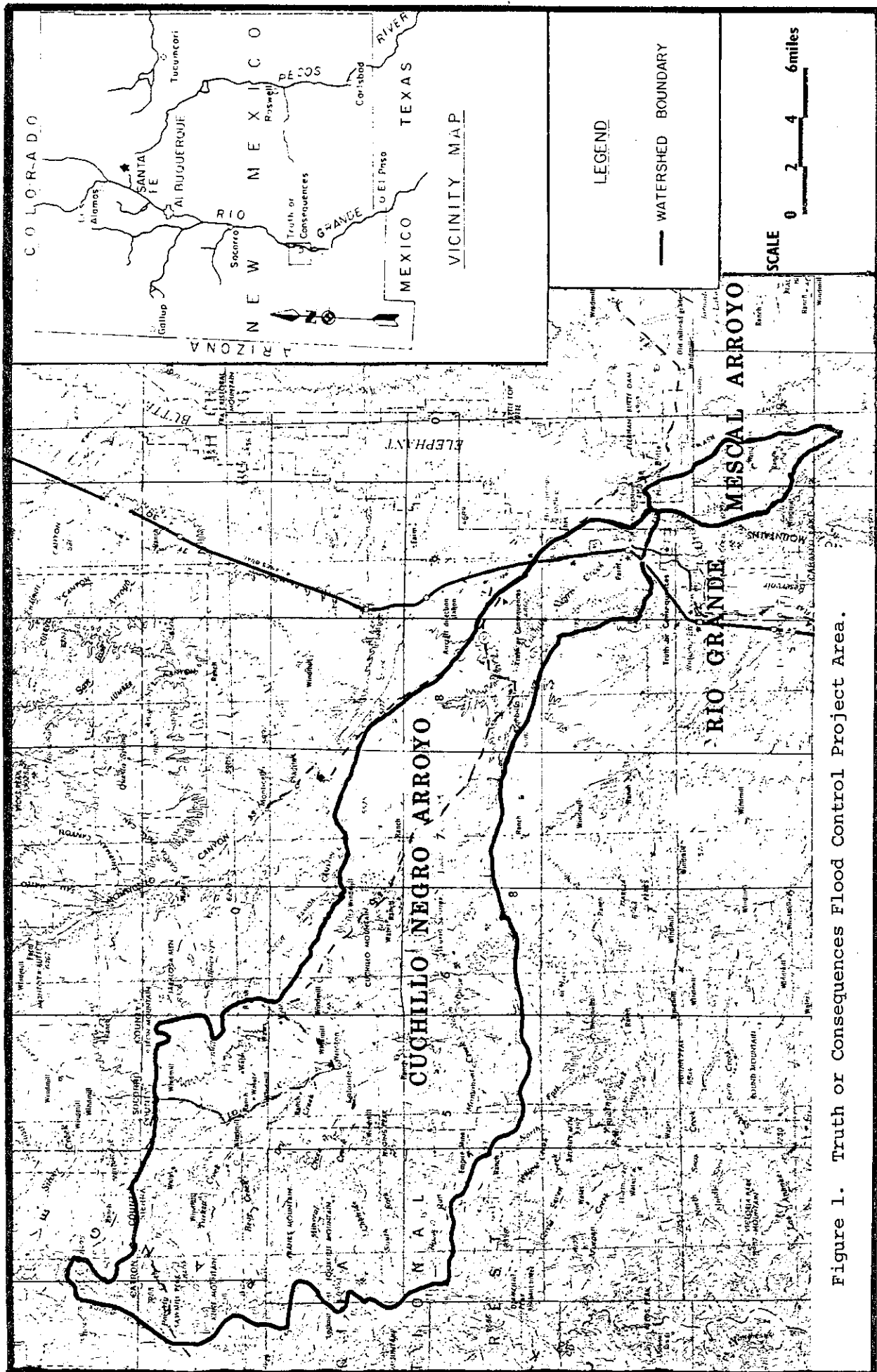


Figure 1. Truth or Consequences Flood Control Project Area.

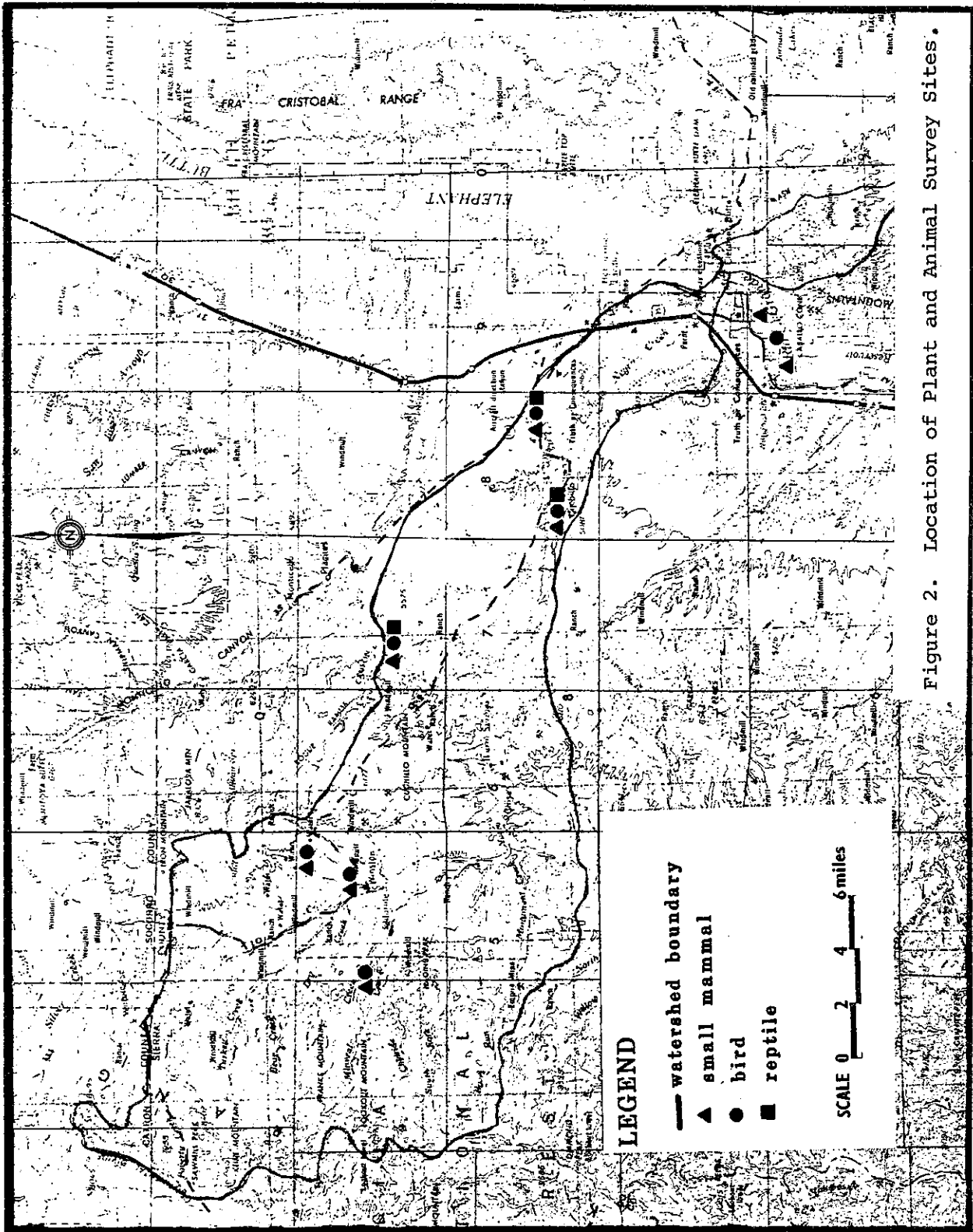


Figure 2. Location of Plant and Animal Survey Sites.

Vegetation measurements were taken in six habitats; mixed shrub, creosotebush, grassland, pinon-juniper/grassland, pinon-juniper and riparian. Plant composition, canopy cover and bare ground were calculated using the 50 point line intercept method. On a pre-selected straight line vegetation measurements were taken at five points every pace. A wood stand was placed on the ground every pace and measurements taken at the points where the pins touched the ground. The pins were spaced four inches apart. When the pin fell on the base of a plant it was recorded as a hit. When the pin missed a plant it was recorded as bare ground. When the pin fell within an area under the vegetation of the plant it was recorded as a canopy hit. When the pin did not hit a plant, the closest plant to the pin was recorded. During each survey 50 points were recorded. To expedite the surveys individual species were not identified but grouped into broad categories of grass, shrub, tree, annual and forb.

Tree density in the pinon-juniper and pinon-juniper/grassland was measured by using the 20 tree method. The surveys were conducted in May 1981. A direction was selected to travel and only trees within 90° were measured. The survey started at one tree and the distance to the nearest tree within the 180° travel direction was measured. The tree was identified to species, height and canopy width. Canopy diameter was measured on the tree where the direction of travel intersected the tree. The distance between trees was measured with a 100 foot tape, the canopy measured with a six foot pole and the height measured with a clinometer.

The riparian habitat was measured by noting the dominant plant species and measuring the width with a stadia rod. Two areas were measured on the east side of the Rio Grande in January 1982. Twenty width measurements spaced 50 feet apart were made in each area. One area was one mile upstream of Williamsburg and the other immediately upstream of Ralph Edwards Park in Truth or Consequences.

Methods for gathering small mammal data were researched with consideration of the habitats found in the project area. Small mammals were trapped in May 1981 using aluminum live traps and snap traps. The aluminum live traps measured 3 x 3.5 x 9 inches made by H. B. Sherman Traps. The snap traps were museum specials measuring 2.6 x 5.5 inches made by Woodstream Corporation. The distance between traps, and bait for each trap were determined from trapping trials in the project area in April 1981. The live traps were baited with grain. The snap traps were baited with peanut butter, rolled oats and an insect repellent, dimethyl phthalate. Each habitat type was trapped with two lines of 20 stations, each station spaced 15 meters apart and each station with one live trap and one snap trap. Three trap nights were recorded for each habitat. Since the riparian habitat was so narrow, a single line of 20 traps were established in two separate areas.

Bird surveys from a boat were selected because it was difficult to see birds on the river and other shoreline and the riparian vegetation was narrow, 0 to 150 feet wide. Brian Hanson conducted all the counts. Each survey started at sunrise on the Rio Grande .8 miles south of Williamsburg at the Canada Honda Arroyo. The counts covered 7.9 miles of stream ending at the Highway 85 bridge. Birds were counted for three minutes at 19 stationary stations which were spaced .4 miles apart. Birds were also counted enroute to the next station. Counts between stations averaged 13 minutes. The three counts averaged four hours and 15 minutes. Counts were made on June 27 and August 5, 1980 and June 25, 1981.

Bird surveys, by walking and counting in a defined strip, were conducted in seven areas; two areas in mixed shrub, two areas in pinon-juniper, one area in creosotebush, grassland, and pinon-juniper/grassland. Brian Hanson conducted all the surveys in June, July and August 1981. A distance for observation for the bird counts was established for each count according to vegetation and terrain. Markers were placed in the ground at the established sighting distance and only birds seen within the markers were recorded. The length of each transect was established according to the distance the observer could walk in a minimum of 30 minutes. The transect started and ended at the same point roughly forming a rectangle. The length, width and area for each transect is summarized in Table 1. The area of each transect varied from 14 acres to 38 acres.

Table 1. Length, Width and Area for each Bird Survey using the Strip Count Method.

Habitat	Length in feet	Width in feet	Area of Survey in acres
Mixed shrub at Cuchillo	1,880	100	4.3
	3,480	250	15.6
Total	5,360	-	19.9
.....
Mixed shrub at Winston	6,338	155	22.7
Creosotebush	7,295	150	25.1
Grassland	4,656	250	26.7
Pinon-juniper/grassland	7,100	230	37.5
Pinon-juniper, north facing	5,334	110	13.5
Pinon-juniper, south facing	5,203	200	23.9

Reptiles were counted by walking transects and reptile live traps. In three habitats reptiles were counted by walking and observing in a defined width. Each observer recorded all reptiles within 6.06 feet of either side of a line. The transects started at 10:15 a.m. and each habitat was counted three times with three different observers. The duration of each count in the three habitats was kept constant at 40 minutes for mixed shrub at Cuchillo, 60 minutes at creosotebush and 30 minutes at grassland. Length, width and area of each transect is summarized in Table 2.

Table 2. Length, Width and Area for each Reptile Survey using the Strip Count Method.

Habitat	Length in feet	Width in feet	Area of Survey in acres
Mixed shrub at Cuchillo	5,363	13.12	1.6
Creosotebush	7,295	13.12	2.2
Grassland	4,656	13.12	1.4

The reptile trap used was a box 39 x 39 x 2 inches with a 1/8 inch wire mesh bottom. At one corner of the trap there was a six inch opening with a wire mesh funnel leading to a 1.5 inch opening near the center of the trap. A wooden box 12 x 5 inches extended out from the trap in the opposite corner from the opening. Eight inches from the end of the funnel a board was nailed to prevent light from entering the box. This trap was designed to attract lizards because of the dark and cool area under the trap. Because of the funnel, the lizards would have a difficult time in getting out of the trap. The reptile traps were put out in June 1981. Five days of trapping with one trap was tried in the mixed shrub, two days in creosotebush and three days in grassland. The trap was checked at 12:00 noon and 5:00 p.m. each day.

Fish data were collected using a 12 volt D.C. Smith-Root electroshocker. The perennial stream in Cuchillo Negro and the wetland at the junction of Cuchillo Negro and the Rio Grande were surveyed. Only species of fish were recorded. The Cuchillo Negro was surveyed on June 27, 1981. Three sample reaches were surveyed; .25 miles downstream of the upper stream origin, midway of the perennial water and at the lower terminus of the perennial water. The wetland was surveyed on August 5, 1980 at one location.

Habitat types

The project area covers 247,500 acres. This includes 400 acres of riverine, riparian and wetland along the Rio Grande, 237,000 acres in the Cuchillo Negro watershed and 10,200 acres in the Mescal watershed. Nine habitats are found within the project area.

Terrestrial and aquatic habitats consist of mixed shrub, creosotebush, grassland, pinon-juniper/grassland, pinon-juniper, ponderosa pine, riparian, wetland and riverine. Areas in each habitat are summarized in Table 3.

Table 3. Acres of each Habitat.

Habitat	Acres
Mixed shrub	27,100
Creosotebush	48,700
Grassland	54,000
Pinon-juniper/grassland	28,500
Pinon-juniper	61,600
Ponderosa pine	27,300
Riparian	135
Wetland	130
Riverine	135

A map showing these habitats can be found in Appendix 1. Scientific names of the plants mentioned in this letter are presented in Appendix 2.

The mixed shrub habitat is dominated by mesquite, burrobrush, saltbush, oak, mormon tea, saltcedar and some grasses such as saltgrass, grama grass, bush muhly grass, and three-awn grass. This habitat type is found in the bottom and side slopes of arroyos.

The creosotebush habitat is dominated by creosotebush with a high percentage of bare ground. Other plant species include mesquite, broom snakeweed, grama grass, tobosa grass, three-awn grass and bush muhly grass. This habitat type varies from rolling hills with few plants to dense stands of creosotebush found in flat terrain.

The grassland habitat is mostly grama grass. Other dominant grass species include bush muhly, three-awn, dropseeds and tobosa grass. The majority of this habitat type occurs in rolling hills found at higher elevations than the creosotebush habitat type.

The pinon-juniper/grassland habitat is dominated by pinon pine, one-seed juniper and grama grass. Grass species found in the grassland habitat type will also be found in this type. This habitat type contains very few shrubs and is found in rolling terrain.

The pinon-juniper habitat is dominated by one-seed juniper and pinon pine with an understory of shrubs. Other plants include alligator juniper, oak, mountain mahogany, apache plume, opuntia cactus, wolfberry, Wright's silk-tassel, grama grass, bush muhly grass, three-awn grass, june grass, aster and buckwheat. This habitat type is found in steep rocky hillsides.

Ponderosa pine habitat is found in small pockets on north facing slopes. Other plants in this type include silverleaf oak, Gambel's oak, gray oak, mountain mahogany, muttongrass, side oats grama, blue grama and mountain muhly grass.

The riparian habitat is dominated by saltcedar and wolfberry with less abundance of cottonwood, whitethorn acacia, and desert willow. The riparian area is found in a narrow band, varying from 0 to 150 feet wide along the Rio Grande mostly on the east side of the river.

The wetland habitat is dominated by bulrushes and cattails. One five-acre wetland is dominated by cattails, while a larger wetland of 120 acres has a good mix of open water and aquatic vegetation. Figures 3 and 4 show the largest wetland at the junction of Highways 51 and 52. This wetland usually dries up in mid summer probably due to pumping from adjacent canals by a nearby golf course.

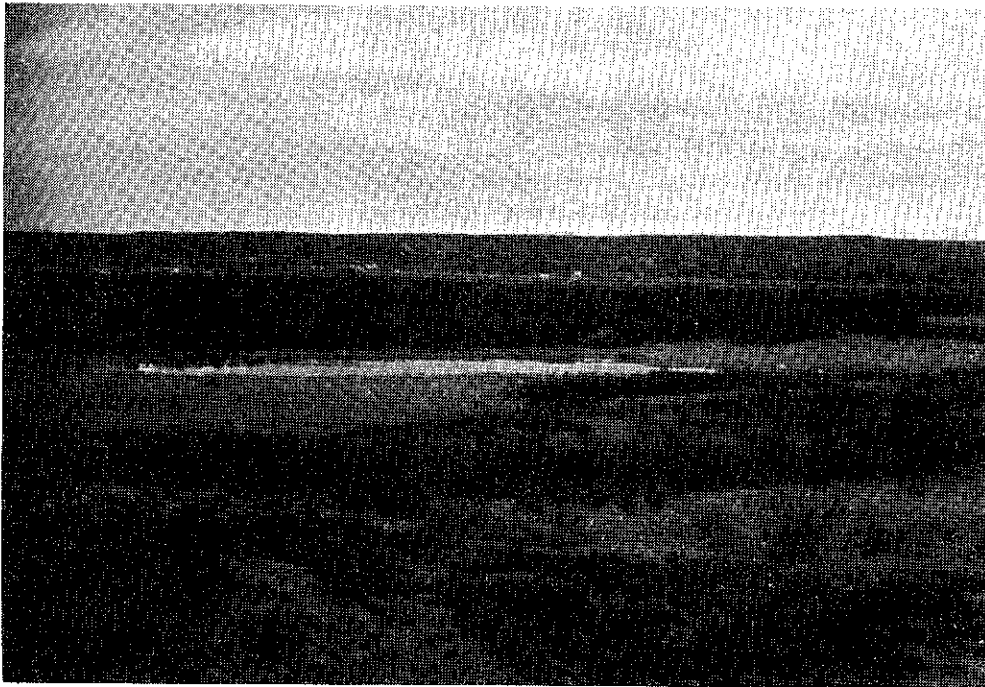


Figure 3. Wetland



Figure 4. Wetland and Rio Grande

The riverine habitat in the Rio Grande is eight miles long in the project area. The Rio Grande has a rectangular box channel structure due to steady releases from the dam and channel maintenance. Summer inflows into the Rio Grande from rainstorms cause sediment build-up in the channel. The Bureau of Reclamation removes this sediment in the fall to maintain a 5,000 cubic feet per second flow capacity in the channel. Whenever water is released from the dam, electricity is generated. About 625 cubic feet per second of water are released to run each of the three power generators. Water is released by the Bureau of Reclamation for use by downstream irrigators. Water releases average 1,900 cubic feet per second from February to September. During the winter there are usually no water releases. When there are no water releases the water flow one mile below the dam averages 12 cubic feet per second. The water depth in the Rio Grande averages less than one foot during these times. Water depths are between 4 and 12 feet with the 1,900 cubic feet per second releases. The substrate in the Rio Grande is generally gravel.

The riverine habitat in the Cuchillo Negro stream is perennial for three miles in length. This area is located 11 miles upstream from the Town of Cuchillo. The stream is very shallow, usually less than six inches deep. The stream originates from a spring. During thunderstorms and spring runoff water flows in the Cuchillo Negro from the Gila National Forest to the Rio Grande below Elephant Butte Dam.

Eight line intercept plant surveys were conducted in the mixed shrub habitat. The mixed shrub habitat surveys north of Winston are separated from the mixed shrub surveys conducted west of Cuchillo because of the distinct differences in vegetation. The results of the line intercept surveys are summarized in Table 4.

Table 4. Plant Composition and Percent Bare Ground in each Habitat using the 50 Point Line Intercept Method.

Habitat	Grass	Shrubs	Trees	Annuals & Forbs	Percent Bare Ground	Number of Data Points
Mixed shrub at Winston	51	49	0	0	83	100
Mixed shrub at Cuchillo	29	44	0	27	76	300
Creosotebush	28	72	0	0	68	250
Grassland	97	2	0	1	78	300
Pinon-juniper	54	37	9	0	90	100

The two surveys north of Winston show an equal mix of shrubs and grasses. The six surveys in the mixed shrub west of Cuchillo show shrubs are dominate followed by grasses, annuals and forbs. Percent of the ground that is bare is greater near Winston than Cuchillo.

Five line intercept plant surveys were conducted in the creosotebush habitat. Shrubs, mainly creosotebush, accounted for three-quarters of the plants. In the grassland habitat, grasses account for nearly 100 percent of the plants. In the pinon-juniper habitat, grass is the dominant plant followed by shrubs. Nine percent of the vegetation is trees composed of eight percent one-seed juniper and one percent pinon pine.

The 20 tree method was used in pinon-juniper and pinon-juniper/grassland habitats. Since there are distinct differences in the vegetation on

north and south facing slopes in the pinon-juniper habitat the vegetation data are separated. The results of the survey are summarized in Table 5.

Table 5. Tree Measurements in the Pinon-juniper and Pinon-Juniper/Grassland Habitats using the 20 Tree Method.

	Pinon-juniper/ grassland	Pinon-juniper, north facing	Pinon-juniper, south facing
<u>Measurement</u>			
Number of trees measured	80	40	40
Canopy diameter in feet	9	8	11
Height in feet	11	13	14
Distance between trees in feet	15	13	22
Number of trees per acre	237	345	88
<u>Species Composition</u>			
One-seed juniper	97.5%	35.0%	25.0%
Pinon-juniper	2.5%	62.5%	67.5%
Alligator juniper	-	2.5%	-
Oak	-	-	7.5%

The pinon-juniper/grassland habitat has a tree composition of 97.5 percent one-seed juniper and 2.5 percent pinon pine. Pinon pine dominates the pinon-juniper habitat. The pinon-juniper, north facing slope has a greater density of trees than the other two areas with the pinon-juniper south facing slope with the least density of trees. Trees are greater in height and canopy diameter in the pinon-juniper habitat than the pinon-juniper/grassland.

The riparian habitat near Williamsburg is 50 percent saltcedar and 50 percent wolfberry. The riparian in Truth or Consequences is 75 percent saltcedar and 25 percent cottonwood. The riparian width averages 86 feet near Williamsburg and 68 feet in Truth or Consequences.

Photographs of the six habitat types are Figures 5-20. The photographs were taken January 14, 1982.



Figure 5. Mixed Shrub West of Cuchillo



Figure 6. Mixed Shrub West of Cuchillo

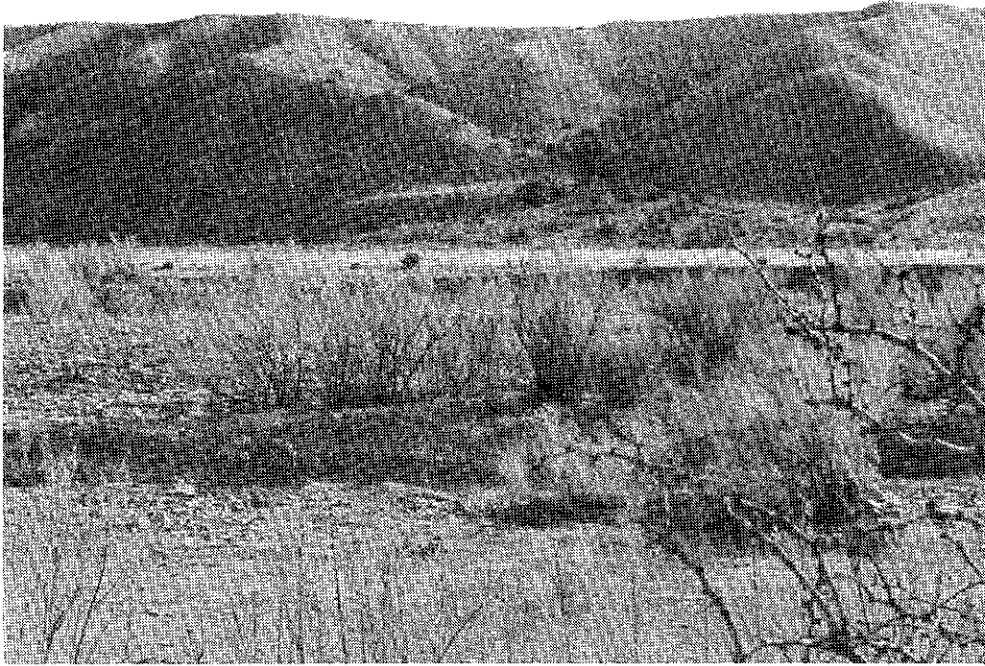


Figure 7. Mixed Shrub West of Cuchillo



Figure 8. Mixed Shrub North of Winston

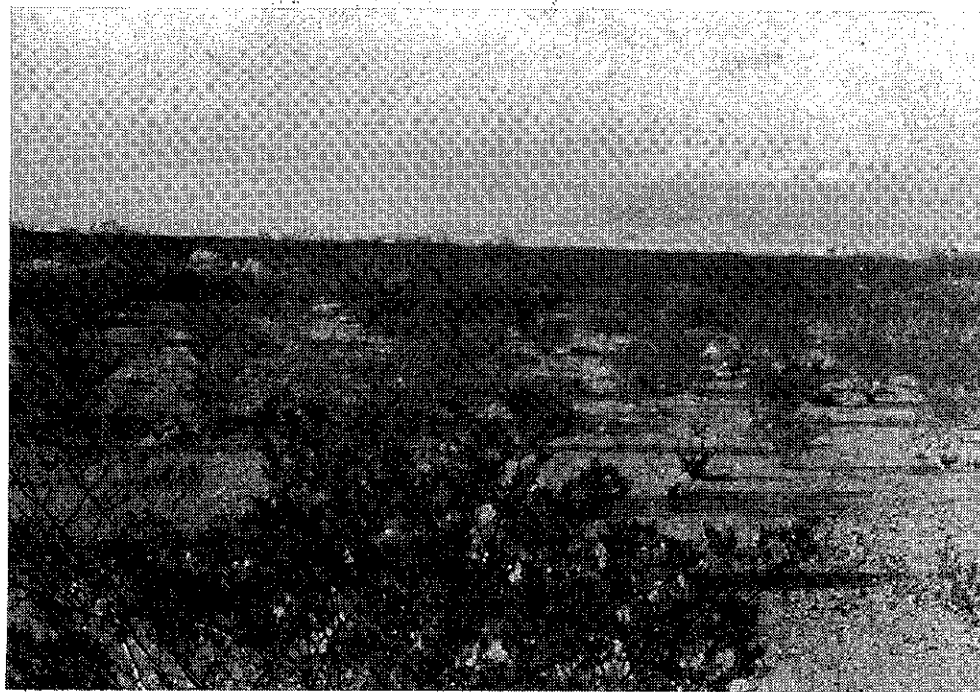


Figure 9. Creosotebush



Figure 10. Pinon-juniper/grassland



Figure 11. Grassland



Figure 12. Grassland

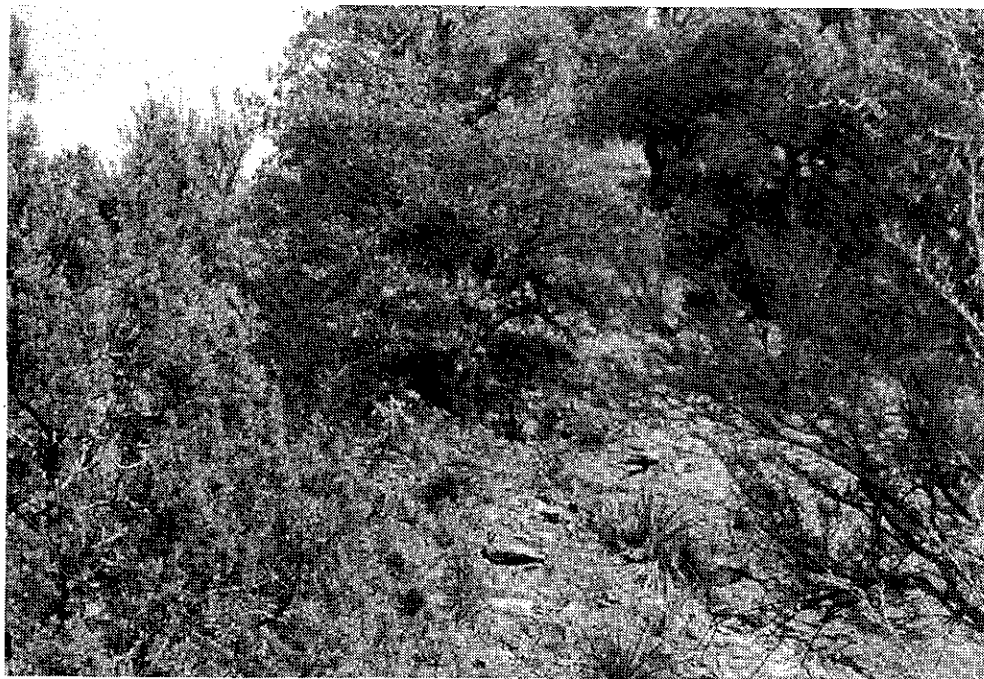


Figure 13. Pinon-juniper, North Facing



Figure 14. Pinon-juniper, North Facing

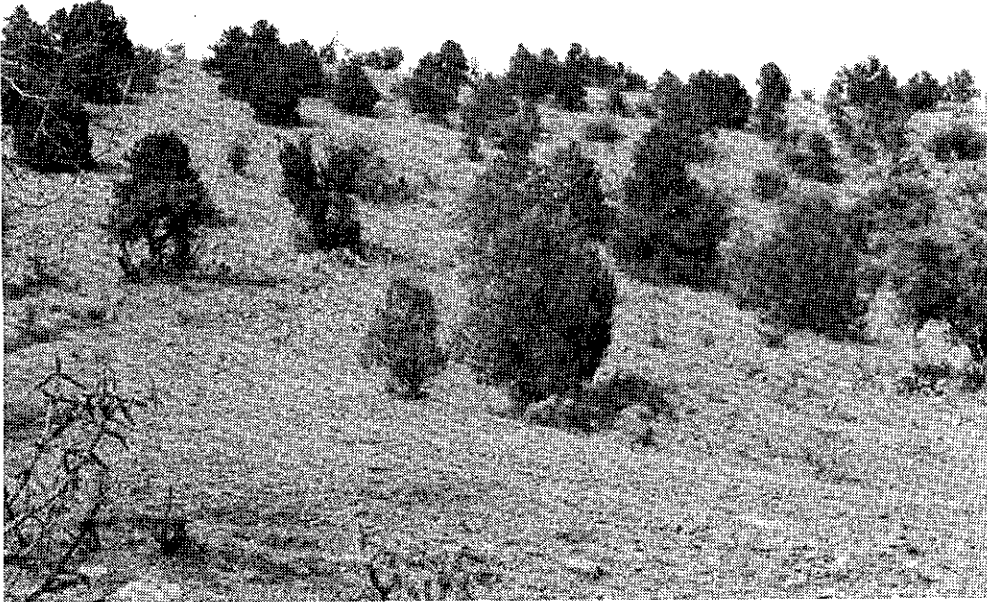


Figure 15. Pinon-juniper, South Facing

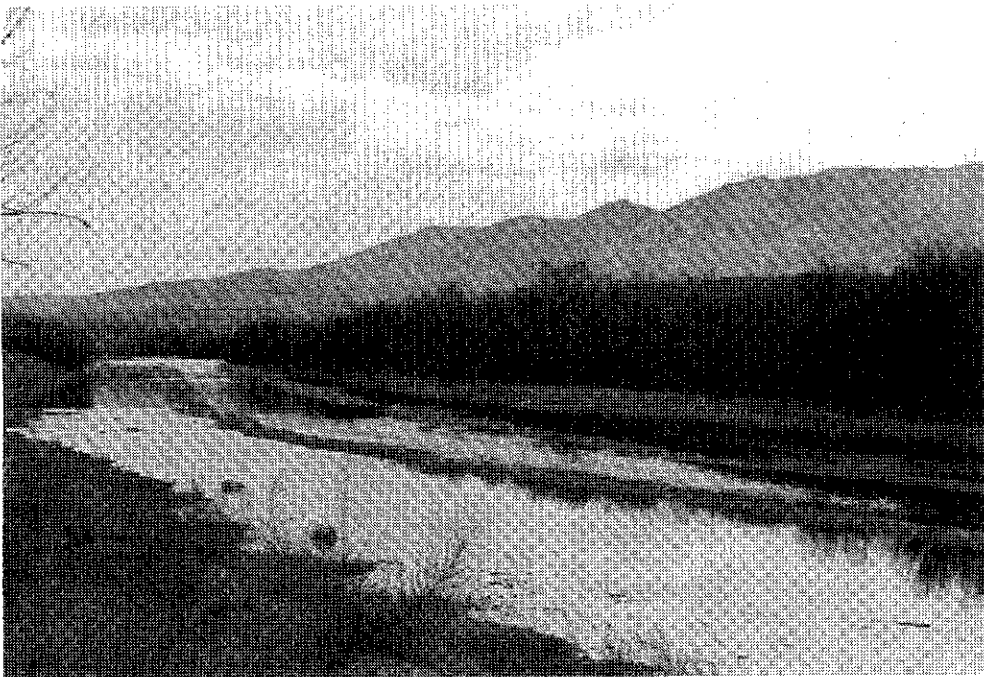


Figure 16. Riparian near Williamsburg

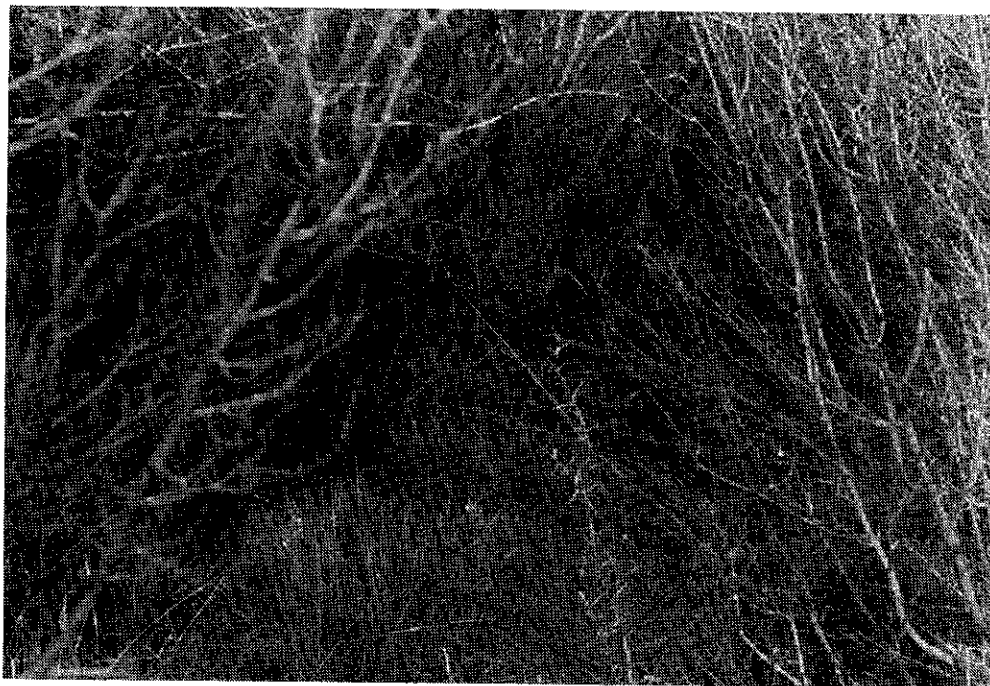


Figure 17. Riparian near Williamsburg



Figure 18. Riparian in Truth or Consequences



Figure 19. Riparian in Truth or Consequences

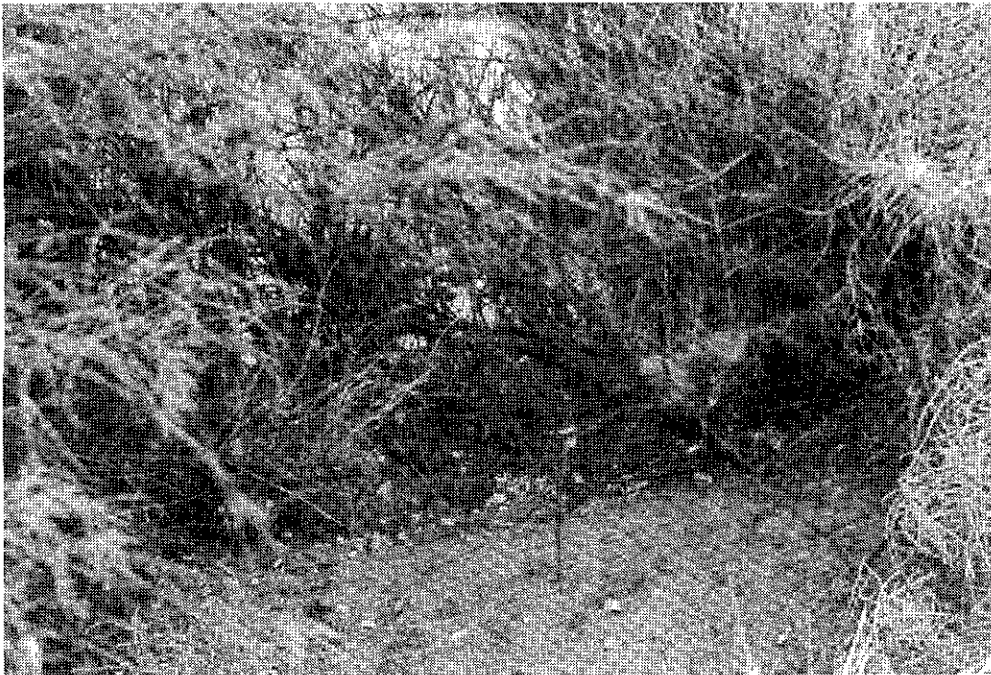


Figure 20. Riparian in Truth or Consequences

Wildlife

Animals which are hunted or trapped in the project area include the desert cottontail, Aberts squirrel, coyote, swift fox, kit fox, gray fox, mountain lion, bobcat, mule deer and pronghorn. Game birds in the area include waterfowl, scaled quail, gambels quail, white-winged dove and mourning dove. Some mammals, birds and reptiles and their preferred habitat in the project area are presented in Table 6. The numerical ranking of 10 indicates the best habitat found in the study area for the species. There may be other species which could be added to this table. Ten does not necessarily imply that the habitat listed is the best habitat for the species. Appendix 3, 4 and 5 contain the scientific names of the mammals, birds, and reptiles mentioned in this letter.

The species which rank high in the mixed shrub habitat are; desert cottontail, black-tailed jackrabbit, gambels quail, verdin, cactus wren, phainopepla, black-throated sparrow, greater earless lizard and side-blotched lizard. Species ranking high in the creosotebush habitat are Merriams kangaroo rat and leopard lizard.

Species ranking high in the grassland habitat are plains harvest mouse, hispid pocket mouse, Ords kangaroo rat, kit fox, badger, pronghorn, red-tailed hawk, scaled quail, horned lark and western meadowlark. In the pinon-juniper habitat species ranking high include pinon mouse, porcupine, mule deer, mountain chickadee, plain titmouse and Townsends solitaire. As can be expected species ranking high in the pinon-juniper/grassland are a combination of the previous two habitats.

Riparian habitat animal species which rank high include mourning dove and northern oriole. Raccoon, American bittern, green-winged teal, red-winged blackbird and bullfrog rank high in wetlands. The riverine habitat contains two species, the belted kingfisher and cliff swallow.

To determine the proper small mammal trapping method, trapping was conducted trying various spacing, traps and bait. In the April test, all trapping stations were spaced seven meters apart. Only once were two mice trapped in consecutive traps during 640 trap nights so we established a 15 meter distance between traps for the May trapping. Grain was chosen as bait for the live traps since this bait trapped 11 mice; traps with peanut butter only trapped two mice.

Fourteen species of small mammals were trapped in the nine areas. Species trapped in each habitat are summarized in Table 7.

Table 6. Relative Values of Habitats for Terrestrial Species within the Project Area as indicated by the Literature.¹

Species	Mixed shrub	Creosotebush	Grassland	Pinon-juniper grassland	Pinon-juniper	Riparian	Wetland	Riverine
Desert cottontail	10	8	6	7	5	9	0	0
Black-tailed jackrabbit	10	9	8	7	0	0	0	0
Plains harvest mouse	0	0	10	9	0	0	0	0
Hispid pocket mouse	0	0	10	9	0	0	0	0
Ords kangaroo rat	8	9	10	7	0	0	0	0
Merriams kangaroo rat	9	10	8	7	0	0	0	0
Pinon mouse	0	0	0	9	10	0	0	0
Porcupine	0	0	0	9	10	0	0	0
Kit fox	9	0	10	8	0	0	0	0
Raccoon	0	0	0	0	0	9	10	0
Badger	9	7	10	8	0	0	0	0
Mule deer	9	0	8	7	10	6	0	0
Pronghorn	0	0	10	9	0	0	0	0
.....
American bittern	0	0	0	0	0	9	10	0
Green-winged teal(wintering)	0	0	0	0	0	9	10	0
Red-tailed hawk	8	0	10	9	0	0	0	0
Scaled quail	9	6	10	7	0	8	0	0
Gambels quail	10	8	7	0	0	9	0	0
Mourning dove	9	0	8	0	0	10	7	0
Belted kingfisher	0	0	0	0	0	8	9	10
Horned lark	0	8	10	9	0	0	0	0
Cliff swallow	7	0	0	0	0	8	9	10
Mountain chickadee	0	0	0	0	10	0	0	0
Plain titmouse	8	0	0	9	10	7	0	0
Verdin	10	9	0	0	0	0	0	0
Cactus wren	10	9	0	0	0	0	0	0
Townsendes solitaire	0	0	0	9	10	0	0	0
Phainopepela	10	0	0	7	9	8	6	0
Red-winged blackbird	0	0	0	0	0	9	10	0
Northern oriole	0	0	0	0	0	10	0	0
Western meadowlark	9	0	10	0	0	0	0	0
Black-throated sparrow	10	9	0	0	0	0	0	0
.....
Bullfrog	0	0	0	0	0	9	10	8
Greater earless lizard	10	9	0	0	8	0	0	0
Leopard lizard	9	10	0	0	0	0	0	0
Side-blotched lizard	10	9	0	0	8	0	0	0

1 10 means the best habitat within the project area, 9 means second best habitat. etc., 0 means probably not found in the habitat. Values were determined by Brian Hanson, Diane Gallegos and Lori Ballinger, U. S. Fish and Wildlife Service, February 1981.

Table 7. Small Mammal Species Trapped in each Habitat.

Species	Mixed shrub at Cuchillo	Mixed shrub at Winston	Creosotebush	Grassland	Pinon-juniper/grassland	Pinon-juniper, north facing	Pinon-juniper, south facing	Riparian in T or C	Riparian near Williamsburg
Cliff chipmunk					X	X	X		
Spotted ground squirrel		X		X					
Silky pocket mouse				X					
Plains pocket mouse				X					
Ords kangaroo rat	X	X	X						
Banner-tailed kangaroo rat		X	X						
Merriams kangaroo rat	X	X	X	X	X				
Western harvest mouse	X	X					X		
Deer mouse		X	X		X				X
White-footed mouse									X
Brush mouse						X	X		
Pinon mouse					X	X	X		
Southern grasshopper mouse			X	X					
White-throated woodrat	X				X				

The mixed shrub habitat at Winston has the most species, six, followed by creosotebush. Riparian habitat is the lowest in species diversity with two species. Merriams kangaroo rat is found in more habitats than any other species. The cliff chipmunk, silky pocket mouse, plains pocket mouse, brush mouse, and white-throated woodrat are found in only one habitat.

The results of the trapping for each trapping area are summarized in Table 8. Comparison of the trapping between habitat types is illustrated in Figure 21. The mixed shrub habitat at Winston, has the highest rate of small mammals captured of all habitats. The riparian habitat composed of 75 percent saltcedar and 25 percent cottonwood has the lowest rate of zero captures. The species trapped the most often in each habitat are:

Ords kangaroo rat -	mixed shrub at Cuchillo
Ords kangaroo rat -	mixed shrub at Winston
Merriams kangaroo rat -	creosotebush
Merriams kangaroo rat -	grassland
Plains pocket mouse -	grassland
Pinon mouse -	pinon-juniper/grassland
Pinon mouse -	pinon-juniper, north facing
Brush mouse -	pinon-juniper, south facing
Deer mouse -	riparian.

At least 42 species of birds were observed on the bird surveys conducted by boat on the Rio Grande. A total of 2,458 birds were counted averaging 819 birds per count. The survey results are presented in Table 9. In the bird count area the river is 135 acres with 133 acres of riparian. If these areas are combined, then the bird density is 819 birds divided by 268 acres or 3.1 birds per acre.

The results of the strip count bird surveys in seven habitats are presented in Table 10. The mixed shrub and creosotebush habitats contain the most number of species with the pinon-juniper habitat the least number. A comparison of birds observed per acre of habitat is presented in Figure 22. The combined riverine and riparian area on the Rio Grande has the highest density followed by mixed shrub at Cuchillo, pinon-juniper north facing, mixed shrub at Winston, creosotebush, pinon-juniper south facing, pinon-juniper/grassland and grassland.

Reptile traps were set in mixed shrub, creosotebush and grassland with no success. The strip counts of reptiles were conducted in the same three habitats. Species diversity of reptiles is highest in the mixed shrub at Cuchillo, five, with three in grassland and two in creosotebush. The results of the transects is exhibited in Table 11.

The tree lizard is dominate in mixed shrub and the desert grassland whiptail dominates both creosotebush and grassland with over 70 percent of the total number of lizards counted. Density of reptiles per acre is 42.1 for grassland, 5.0 for grassland and 5.0 for creosotebush.

Table 8. Small Mammals Trapped, Percent Species Composition and Trap Night Comparisons of Habitats.

Species	Number Captured	Species Composition, Percent of total	Animals trapped per 1,000 trap nights
<u>Mixed shrub at Cuchillo-223 trap nights</u>			
Ords kangaroo rat	8	66.7	37
White-throated woodrat	2	16.7	9
Merriams kangaroo rat	1	8.3	4
Western harvest mouse	1	8.3	4
Total	12	100.0	54
<u>Mixed shrub at Winston 107 trap nights</u>			
Ords kangaroo rat	9	40.9	84
Merriam kangaroo rat	4	18.2	38
Deer mouse	4	18.2	38
Spotted ground squirrel	3	13.7	28
Banner-tailed kangaroo rat	1	4.5	9
Western harvest mouse	1	4.5	9
Total	22	100.0	206
<u>Creosotebush-332 trap nights</u>			
Merriams kangaroo rat	26	84.0	78
Deer mouse	2	6.4	6
Ords kangaroo rat	1	3.2	3
Southern grasshopper mouse	1	3.2	3
Banner-tailed kangaroo rat	1	3.2	3
Total	31	100.0	93
<u>Grassland-212 trap nights</u>			
Merriams kangaroo rat	2	28.6	9
Plains pocket mouse	2	28.6	9
Spotted ground squirrel	1	14.3	5
Silky pocket mouse	1	14.3	5
Southern grasshopper mouse	1	14.3	5
Total	7	100.1	33
<u>Pinon-juniper/grassland-227 trap nights</u>			
Pinon mouse	5	50.0	22
White-throated woodrat	2	20.0	9
Deer mouse	2	20.0	9
Merriams kangaroo rat	1	10.0	4
Total	10	100.0	44
<u>Pinon-juniper, north facing-114 trap nights</u>			
Pinon mouse	14	66.7	122
Cliff chipmunk	5	23.8	44
Brush mouse	2	9.5	18
Total	21	100.0	184
<u>Pinon-juniper, south facing-117 trap nights</u>			
Brush mouse	3	50.0	27
Pinon mouse	1	16.7	8
Cliff chipmunk	1	16.7	8
Western harvest mouse	1	16.8	8
Total	6	100.0	51
<u>Riparian in T or C-114 trap nights</u>			
No species captured.			
Total	0	0	0
<u>Riparian near Williamsburg-113 trap nights</u>			
Deer mouse	2	66.7	18
White-footed mouse	1	33.3	9
Total	3	100.0	27

Table 9. Birds counted on the Rio Grande between Elephant Butte Dam and Williamsburg.

Bird	June 27, 1980	August 5, 1980	June 25, 1981	Total birds	Percent of total birds
Double-crested cormorant	6	0	5	11	.45
Green heron	2	0	0	2	.08
Waterfowl	0	1	0	1	.04
Turkey vulture	10	11	22	43	1.75
American kestrel	2	0	0	2	.08
Gambels quail	5	0	0	5	.20
Killdeer	6	0	2	8	.33
Rock dove	2	6	2	10	.41
White-winged dove	18	14	1	33	1.34
Mourning dove	36	23	31	90	3.66
Yellow-billed cuckoo	1	0	0	1	.04
Lesser nighthawk	0	4	4	8	.33
White-throated swift	1	0	0	1	.04
Hummingbird	9	9	6	24	.98
Western kingbird	25	37	35	97	3.95
Black phoebe	1	1	0	2	.08
Says phoebe	2	1	0	3	.12
Violet-green swallow	5	5	8	18	.73
Rough-winged swallow	206	69	10	285	11.59
Barn swallow	0	9	47	56	2.28
Cliff swallow	99	139	46	284	11.55
Common raven	0	2	2	4	.16
Northern mockingbird	47	0	5	52	2.12
Gray catbird	0	1	0	1	.04
Brown thrasher	0	1	0	1	.04
Crissal thrasher	1	0	0	1	.04
American robin	1	0	0	1	.04
Phainopepla	47	38	77	162	6.59
Starling	11	1	1	13	.53
Common yellowthroat	5	0	0	5	.20
Yellow-breasted chat	4	0	0	4	.16
House sparrow	126	128	72	326	13.26
Yellow-headed blackbird	1	0	2	3	.12
Red-winged blackbird	66	23	81	170	6.92
Northern oriole	20	2	0	22	.90
Great-tailed grackle	49	51	39	139	5.65
Brown-headed cowbird	13	56	0	69	2.81
Western tanager	0	0	1	1	.04
House finch	29	2	3	34	1.38
Lesser goldfinch	5	0	0	5	.20
Rufous-sided towhee	1	1	0	2	.08
Black-throated sparrow	1	0	0	1	.04
Unknown	38	155	259	452	18.40
Total	902	794	762	2458	

Table 10. Birds counted using the Strip Count Method in each Habitat.

Species	Number of birds counted	Percent of birds counted
<u>Mixed shrub at Cuchillo - 3 surveys</u>		
Lark bunting	59	41.8
Mourning dove	6	4.3
Western kingbird	4	2.8
Gambels quail	2	1.4
Ash-throated flycatcher	2	1.4
Lark sparrow	2	1.4
Black-throated sparrow	2	1.4
Loggerhead shrike	1	.7
Lesser nighthawk	1	.7
Unknown	61	43.3
Total	141	
<u>Mixed shrub at Winston - 2 surveys</u>		
Black-throated sparrow	8	25.0
Common bushtit	6	18.8
Western kingbird	5	15.6
House finch	4	12.5
Gambels quail	2	6.3
Mourning dove	1	3.1
Blue grosbeak	1	3.1
Unknown	5	15.6
Total	32	
<u>Creosotebush - 4 surveys</u>		
Black-throated sparrow	21	44.7
Mourning dove	7	14.9
Western kingbird	2	4.3
Common raven	2	4.3
Lesser nighthawk	1	2.1
Hummingbird	1	2.1
Loggerhead shrike	1	2.1
Lark bunting	1	2.1
Unknown	11	23.4
Total	47	
<u>Grassland - 4 surveys</u>		
Horned lark	12	50.0
Lesser nighthawk	4	16.7
Western kingbird	2	8.3
Black-throated sparrow	2	8.3
Loggerhead shrike	1	4.2
Lark sparrow	1	4.2
Unknown	2	8.3
Total	24	
<u>Pinon-juniper/grassland-2 surveys</u>		
Pinon jay	2	12.5
Unknown	14	87.5
Total	16	
<u>Pinon-juniper, north facing - 1 survey</u>		
Hairy woodpecker	1	6.7
Bridled titmouse	1	6.7
Robin	1	6.7
Western tanager	1	6.7
Unknown	11	73.3
Total	15	
<u>Pinon-juniper, south facing - 1 survey</u>		
Mountain chickadee	3	23.1
Bridled titmouse	3	23.1
Hairy woodpecker	1	7.7
Unknown	6	46.1
Total	13	

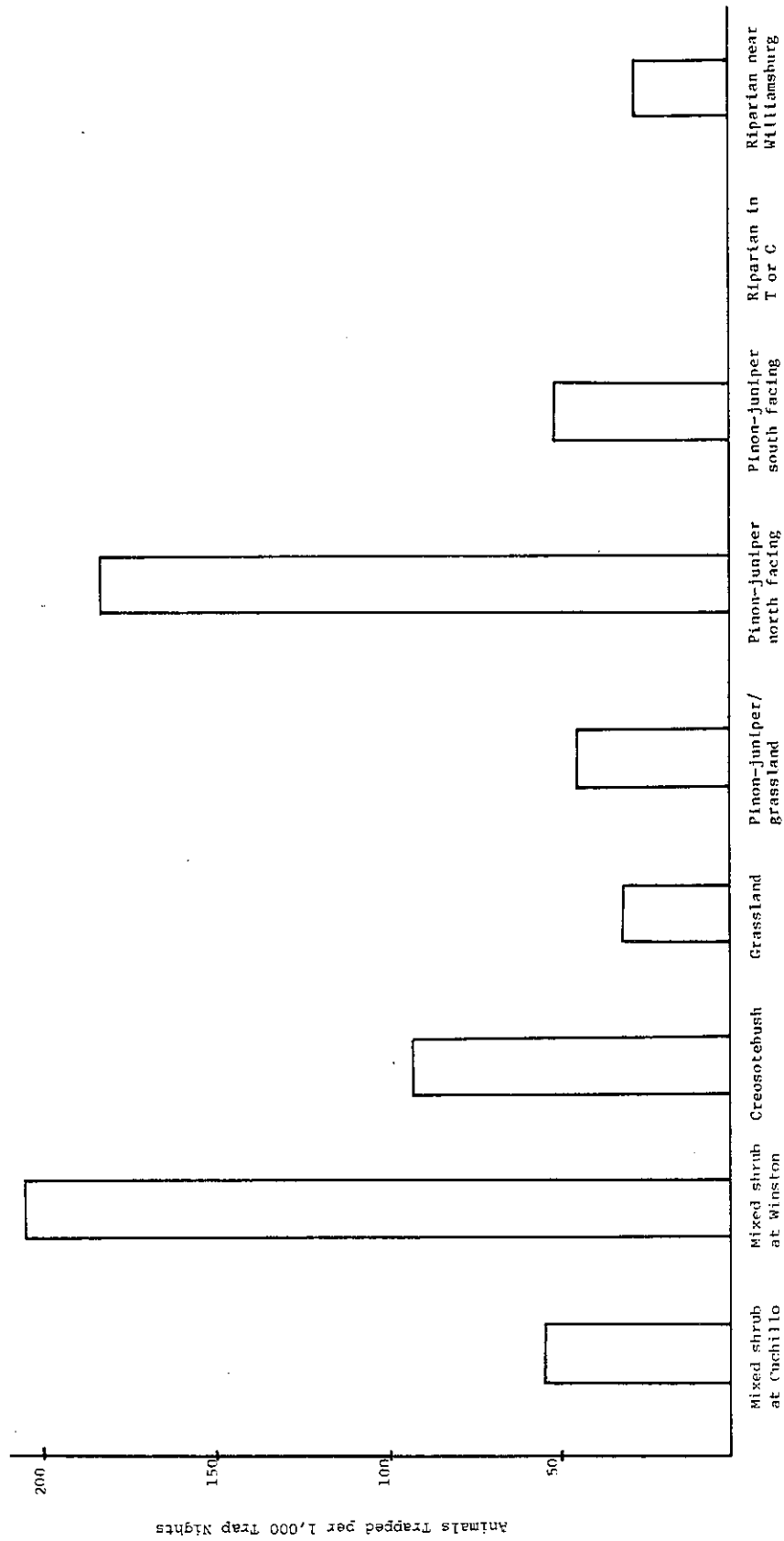


Figure 21. Comparison of Small Mammal Trapping Success Between Habitats.

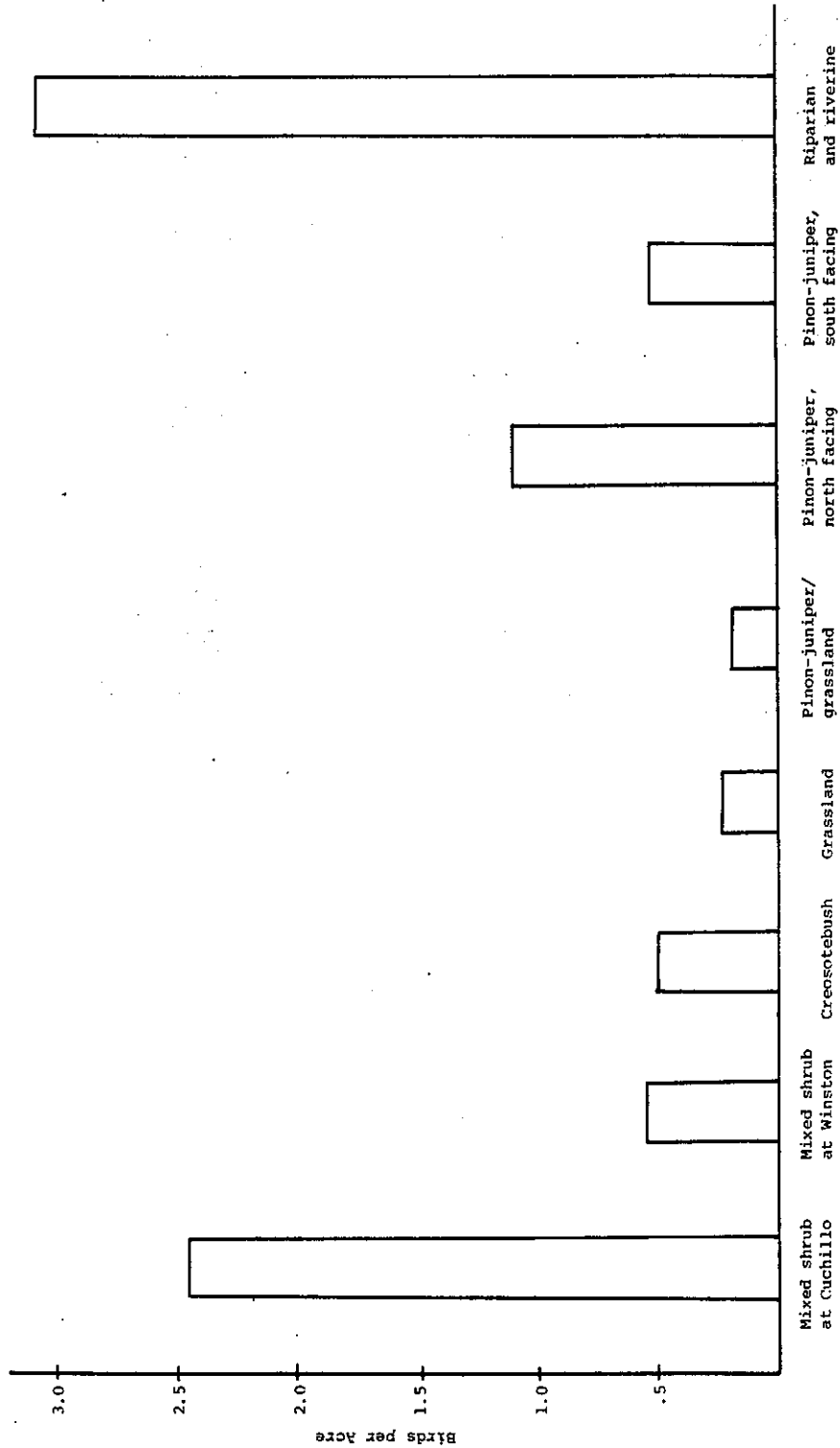


Figure 22. Density of Birds per Acre for all Habitats.

Table 11. Reptiles Counted and Species Composition using the Strip Count Method.

Species	Number Counted	Species Composition Percent of Total
<u>Mixed shrub at Cuchillo</u>		
Tree lizard	3	37.5
Collared lizard	1	12.5
Clarks spiny lizard	1	12.5
Crevice lizard	1	12.5
Side-blotched lizard	1	12.5
Unknown	<u>1</u>	<u>12.5</u>
Total	8	100.0
<u>Creosotebush</u>		
Desert grassland whiptail	8	72.7
Checkered whiptail	2	18.2
Unknown	<u>1</u>	<u>9.1</u>
Total	11	100.0
<u>Grassland</u>		
Desert grassland whiptail	48	81.3
Lesser earless	3	5.1
Round-tailed horned lizard	1	1.7
Unknown	<u>7</u>	<u>11.9</u>
Total	59	100.0

Fish

There are two streams in the project area, the Rio Grande below Elephant Butte and the Cuchillo Negro. The Rio Grande supports a marginal sport fishery whereas the Cuchillo Negro supports only nongame fish.

As many as 30 fish species may occur in the Rio Grande, 12 nongame species and 18 game species. In Table 12 the fish species that may occur in the Rio Grande are listed. Scientific names are presented in Appendix 6.

Table 12. Fish species which may occur in the Rio Grande between Elephant Butte Dam and Caballo Reservoir.

<u>Game Species</u>	<u>Nongame Species</u>
Rainbow trout	Gizzard shad
Northern pike	Threadfin shad
Blue catfish	Goldfish
Black bullhead	Carp
Yellow bullhead	Red shiner
Channel catfish	Fathead minnow
Flathead catfish	Bullhead minnow
White bass	River carpsucker
Striped bass	White sucker
Green sunfish	Smallmouth buffalo
Bluegill	Mosquitofish
Longear sunfish	Warmouth
Smallmouth bass	
Largemouth bass	
White crappie	
Black crappie	
Yellow perch	
Walleye	

1. Burrough, M.A. 1980. Management Considerations for the Stream Fishing in the Rio Grande between Elephant Butte Dam and Caballo Reservoir. Master's thesis, New Mexico State University, Las Cruces. 85 pp.

The most abundant fish in the Rio Grande according to fish surveys conducted in 1977 by Gabriel Desmare were carp, catfish, gizzard shad, longear sunfish and Gambusia. Carp accounted for 89 percent of the total biomass. Mr. Desmare conducted 15 surveys during the year and his results are summarized in Table 13.

Table 13. Fish Biomass and Number of Fish Captured in the Rio Grande between the Highway 51 bridge crossing and Williamsburg, New Mexico.

Fish	Ranked ² Biomass	Ranked Number ³ of fish	Biomass in pounds	Percent of total Biomass	Number of fish	Percent of total fish
Carp	1	2	617.6000	89.2217	330	20.122
Catfish	2	6	38.3768	5.5441	71	4.329
Gizzard shad	3	3	24.6600	3.5625	157	9.573
Longear sunfish	4	8	5.7850	.8357	42	2.561
Gambusia	5	1	1.5465	.2234	705	42.988
Rainbow trout	6					
Goldfish	7	13	1.1199	.1618	3	.183
Red shiner	8	14	.8576	.1239	1	.061
White bass	9	4	.4264	.0616	153	9.329
Black crappie	10	13	.3348	.0484	3	.183
		14	.2932	.0424	1	.061
Yellow bullhead	11					
Green sunfish	12	13	.2905	.0420	3	.183
Bullhead minnow	13	10	.2876	.0415	11	.670
Smallmouth bass	14	7	.2362	.0341	52	3.171
Cyprinus sp.	15	12	.1698	.0245	4	.244
		5	.1565	.0226	80	4.878
Shiner	16					
Rio Grande shiner	17	9	.0331	.0048	14	.854
Largemouth bass	18	11	.0308	.0044	9	.549
		14	.0044	.0006	1	.061

1

The data was provided by Gabriel Desmare who conducted electroshocking surveys in 1977 as part of a Master's thesis. The information was from Stations 2,3,4,5 and 6 which were surveyed 15 times during the year. Mr. Desmare's report is entitled "Changes in Water Quality and Fish Fauna in the Rio Grande between Elephant Butte Dam and Caballo Lake," Master's Thesis at New Mexico State University, Las Cruces. May 1978. 79pp.

2

The largest biomass is represented by the number 1.

3

The most number of individual fish is represented by the number 1.

The New Mexico Department of Game and Fish stocks approximately 18,000 rainbow trout annually in the Rio Grande from November to June. In addition northern pike and channel catfish were stocked in 1975 and 1979. Creel surveys conducted by Conservation Officers with the New Mexico Department of Game and Fish have recorded an overall catch of .44 fish per hour from January 1976 to January 1981. Conservation Officers checked 2,511 anglers who had fished for a total of 4,717 hours. The most abundant fish caught was rainbow trout, white bass and catfish. Other fish in decreasing order of abundance were northern pike, crappie, walleye pike and largemouth bass.

A postal survey was conducted by the Department to sample fishing use in 1975. Ten percent of all fishing license holders in the State were sampled along with a one to three percent also sampled every month. The projected amount for the Rio Grande in the project area was approximately 30,000 annual angler-days with a projected harvest of 70,000 fish. Another postal survey was conducted in 1978 which sampled 10 percent of fishing license holders. The projected figures were approximately 27,000 annual angler-days with a projected harvest of 68,000 fish.

Cuchillo Negro is perennial in three miles of stream. This stream was surveyed in June 1981. Photographs of the perennial portion of the stream are Figures 23 and 24. At the three survey sites the longfin dace was the only fish captured. The wetland at the junction of Highways 51 and 52 was surveyed in August 1980. Carp, goldfish, green sunfish and warmmouth were captured.



Figure 23. Cuchillo Negro stream near Chise

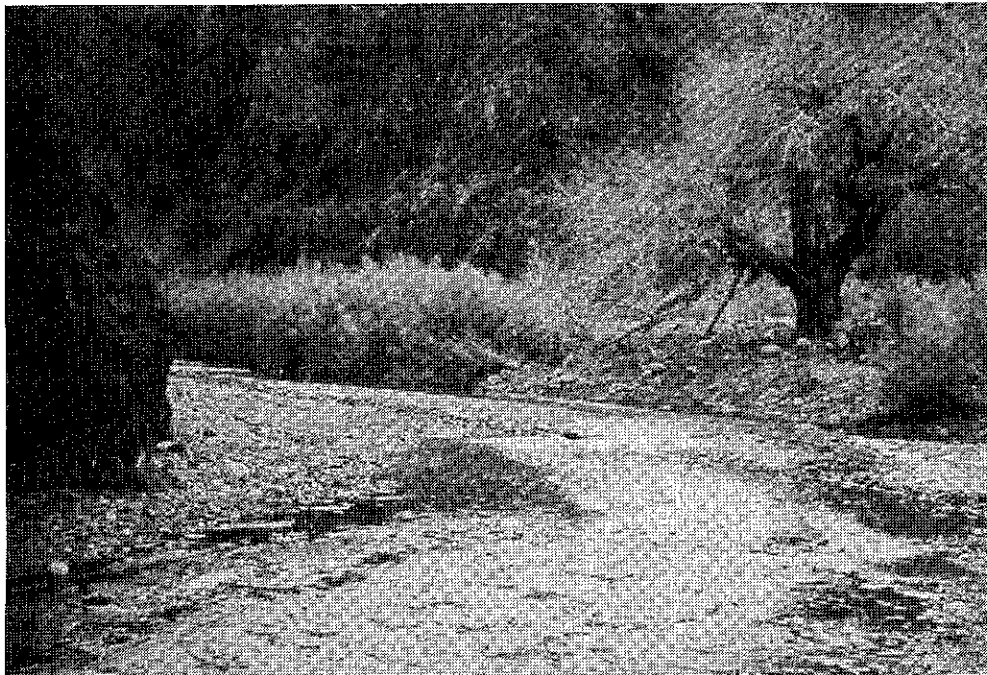


Figure 24. Cuchillo Negro stream near Chise

Conclusions

Small mammal and bird surveys were conducted in seven habitats with the reptile surveys in three habitats. The species trapped or sighted the most often in each habitat during our field studies are displayed in Table 14.

Additional surveys should be conducted because of the short duration of our field studies and the low number of counts. Our listing of dominant species may not be accurate since we only sampled during several days of the year. In addition, the true dominate species may change from year to year and to use data from only one year may not reflect the species which are dominate during most years. Even relative comparison between habitats of one species may not be accurate since the habitats change from year to year.

Table 14. The most Abundant Small Mammal, Bird and Reptile in each Habitat according to Field Studies.

Habitat	Small Mammal	Bird	Reptile
Mixed shrub at Cuchillo	Ords Kangaroo rat	Lark bunting	Tree lizard
Mixed shrub at Winston	Ords kangaroo rat	Black-throated sparrow	*
Creosotebush	Merriams kangaroo rat	Black-throated sparrow	Desert grassland whiptail
Grassland	*	Horned lark	Desert grassland whiptail
Pinon-juniper/grassland	Pinon mouse	*	*
Pinon-juniper, north facing	Pinon mouse	*	*
Pinon-juniper, south facing	Brush mouse	*	*
Riparian	Deer mouse	House sparrow	*

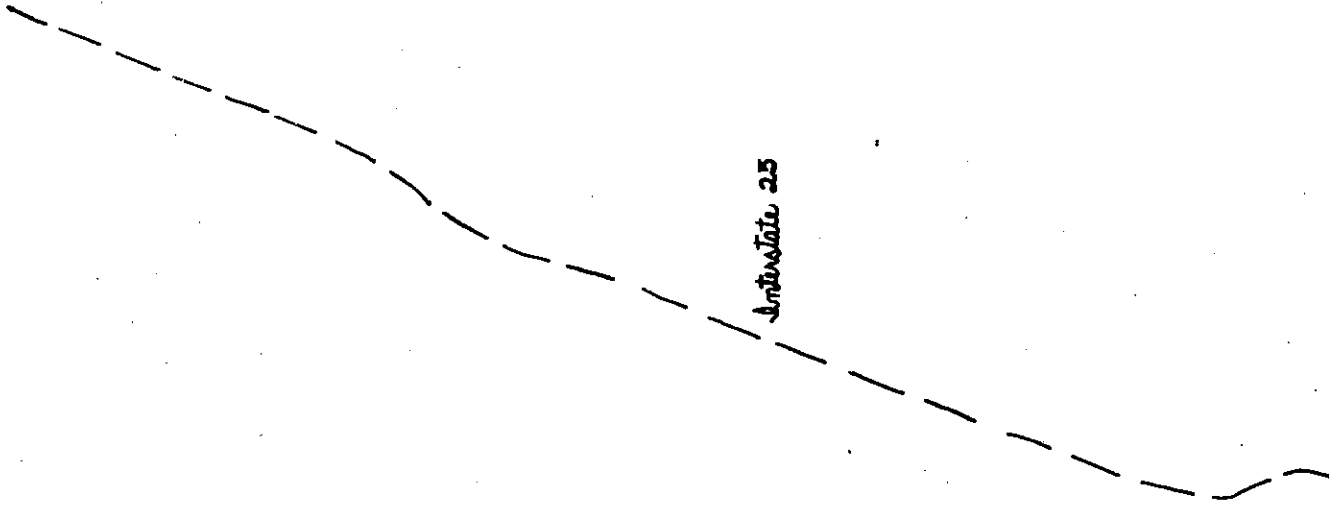
* Not enough data to determine most abundant or survey not conducted.

Top left

Appendix 1.
Habitat types in the
Tenth or Consequenced Project Area
(pages 5)



Tip Middle Appendix 1.



Interstate 25

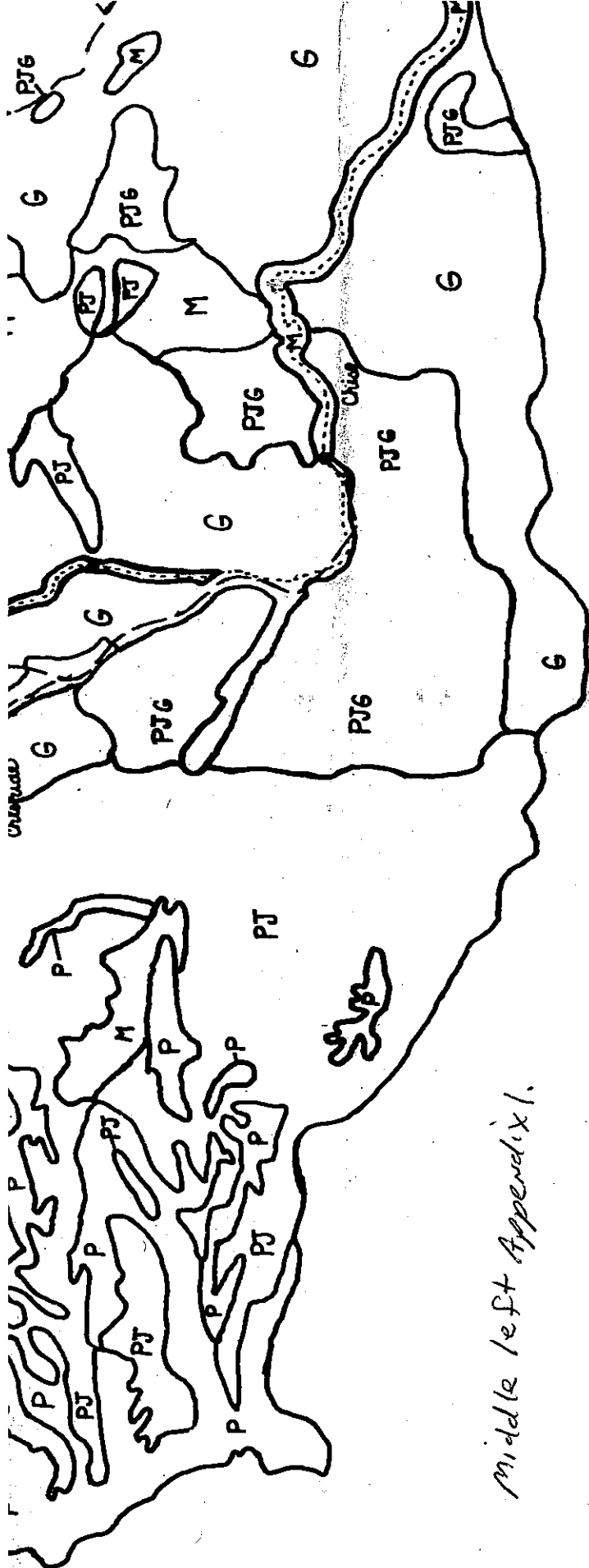
Monticello



Top Right Appendix 1

Antelope 25





Cuchillo Negro Watershed

Middle Left Appendix 1.

Legend ↑ N

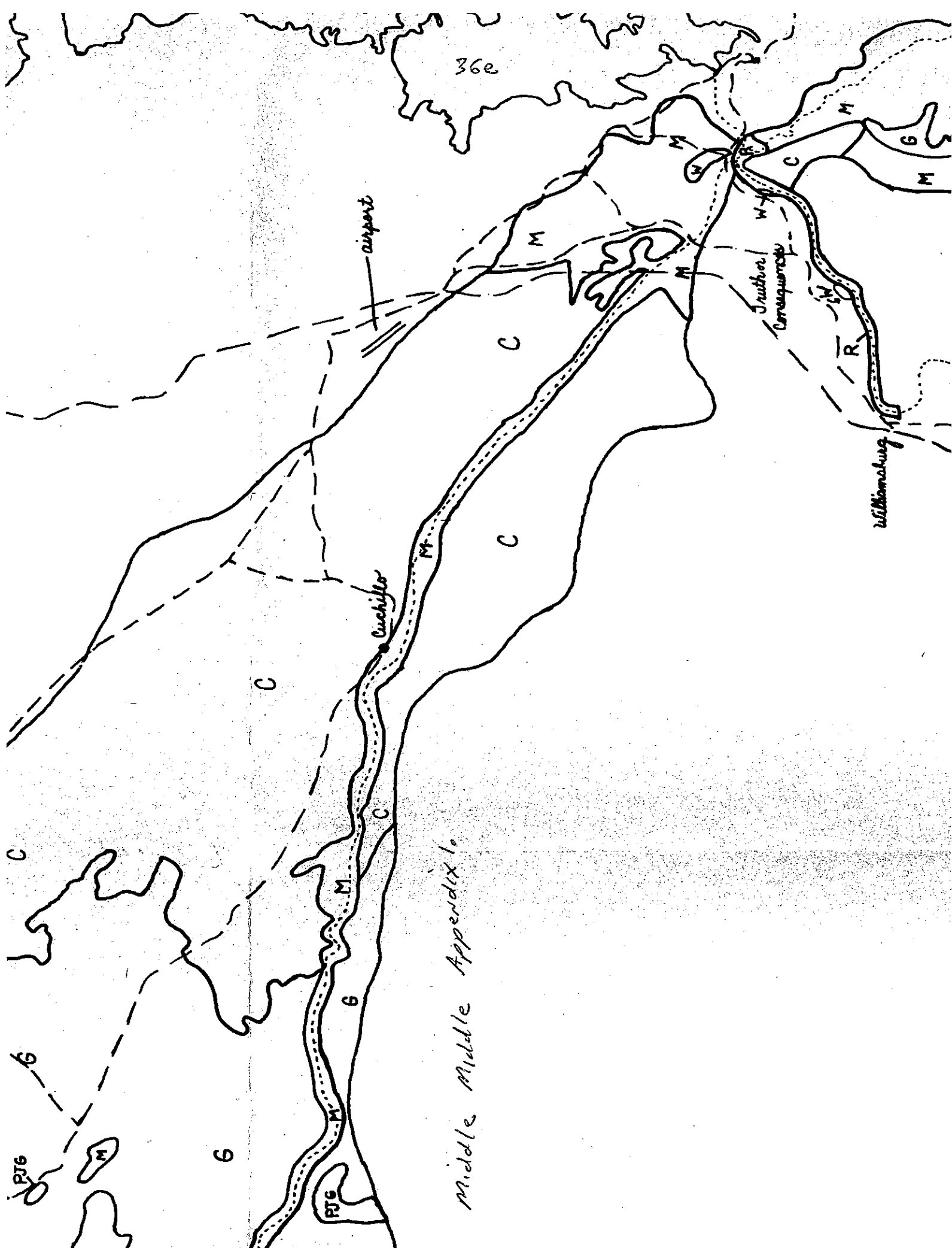
Scale 0 1 2 3 miles

Road - - - - -

Stream

Vegetation Type

- P Ponderosa pine
- PJ Piñon-juniper
- PJG Piñon-juniper/grassland
- G Grassland



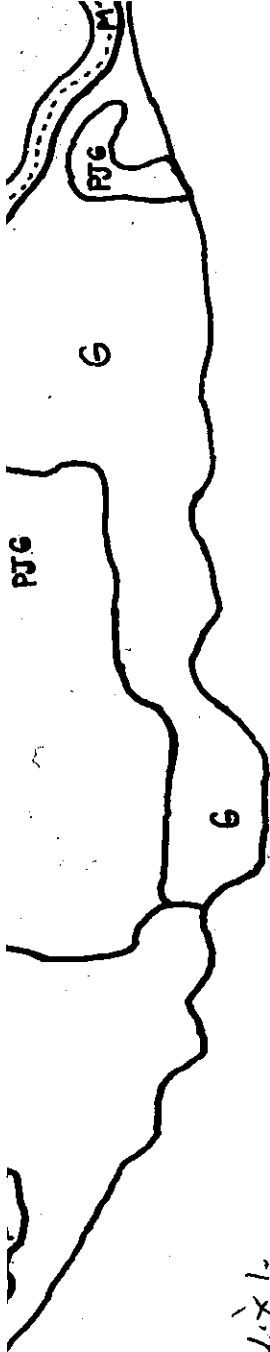
Middle Middle Appendix 1.

Right Middle Appendix 1.



Bottom Left Appendix 1.

Cuchillo Negro Watershed



Legend ↑ N

Scale 0 1 2 3 miles

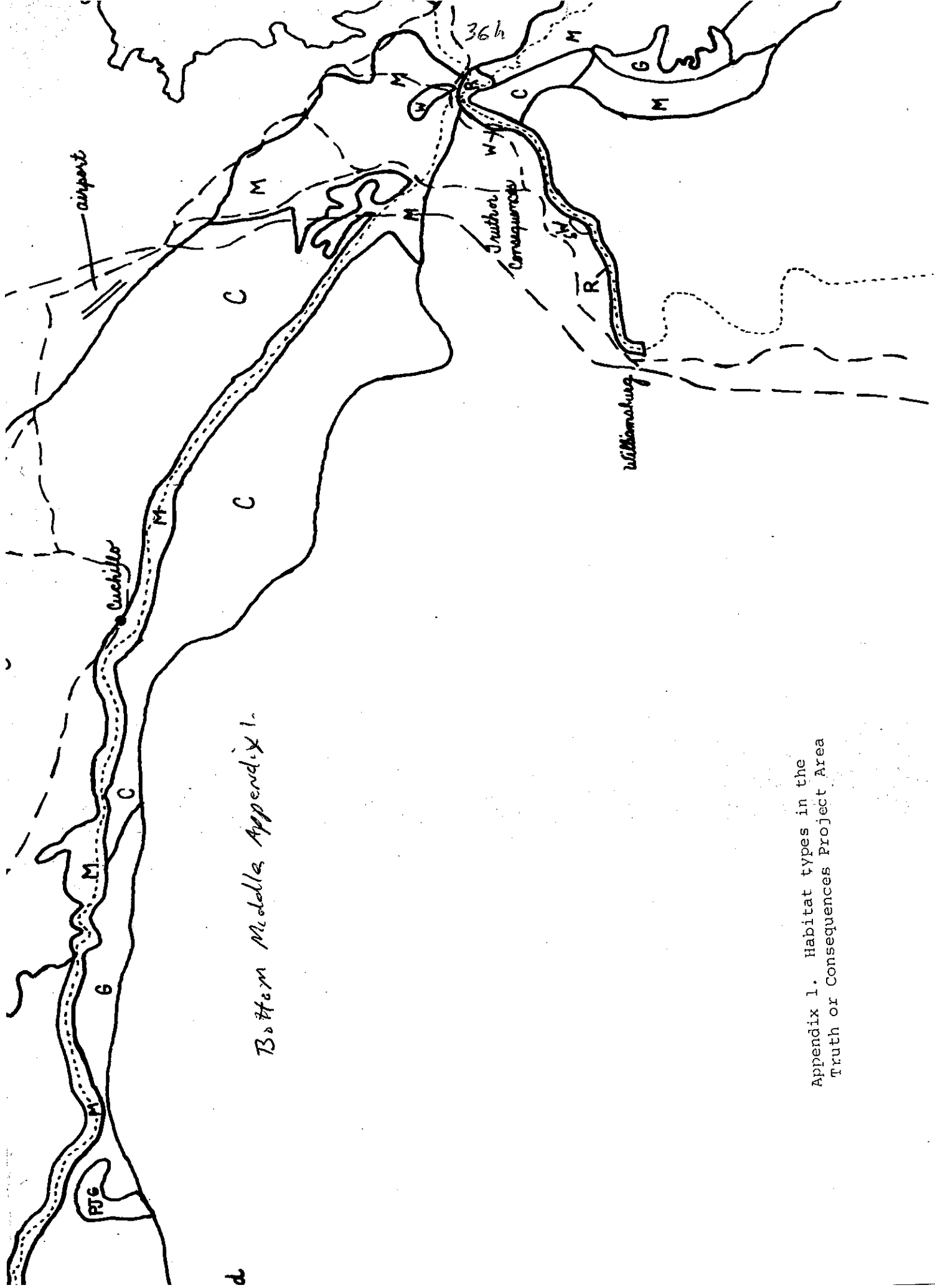
Road

Stream

Vegetation Type



- P Ponderosa pine
- PJ Piñon-juniper
- PJG Piñon-juniper/grassland
- G Grassland
- M Mixed shrub
- C Creosotebush
- R Riparian
- W Wetland



Bottom Middle Appendix 1.

Appendix 1. Habitat types in the
Truth or Consequences Project Area

Bottom Right Appendix 1.

Engle

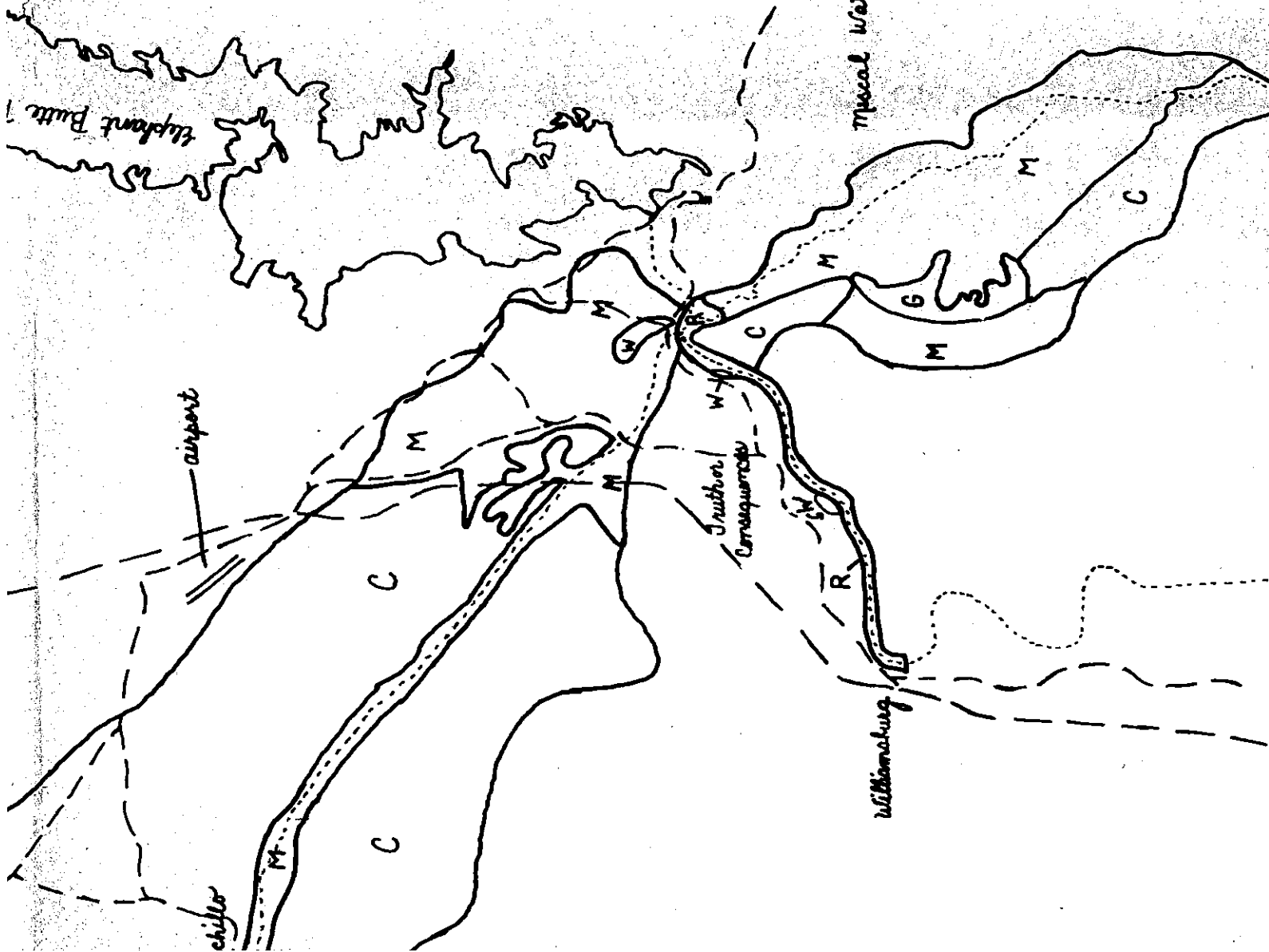
Mescal Watershed

Author/
Consequence

Williamburg

airport

chiller



Appendix 2. Common and Scientific Names of Plants mentioned in Letter.

<u>Common Name</u>	<u>Scientific Name</u>
<u>Grasses</u>	
Blue grama	<u>Bouteloua gracilis</u>
Bulrush	<u>Scirpus spp.</u>
Bush muhly	<u>Muhlenbergia porteri</u>
Cattail	<u>Typha spp.</u>
Dropseed	<u>Sporobolus spp.</u>
Gramma grass	<u>Bouteloua spp.</u>
June grass	<u>Koeleria cristata</u>
Mountain muhly	<u>Muhlenbergia montana</u>
Muttongrass	<u>Poa fendleriana</u>
Saltgrass	<u>Distichlis spicata</u>
Side-oats grama	<u>Bouteloua curtipendula</u>
Three-awn	<u>Aristida spp.</u>
Tobosa grass	<u>Hilaria mutica</u>
<u>Shrubs</u>	
Apache plume	<u>Fallugia paradoxa</u>
Broom snakeweed	<u>Gutierrezia sarothrae</u>
Burrobrush	<u>Hymenoclea spp.</u>
Creosotebush	<u>Larrea tridentata</u>
Desert willow	<u>Chilopsis linearis</u>
Gambel's oak	<u>Quercus gambelii</u>
Gray oak	<u>Quercus grisea</u>
Mesquite	<u>Prosopis spp.</u>
Mormon tea	<u>Ephedra spp.</u>
Mountain mahogany	<u>Cercocarpus montanus</u>
Oak	<u>Quercus spp.</u>
Opuntia cactus	<u>Opuntia spp.</u>
Saltbush	<u>Atriplex canescens</u>
Saltcedar	<u>Tamarix pentandra</u>
Silverleaf oak	<u>Quercus hypoleucoides</u>
Whitethorn acacia	<u>Acacia constricta</u>
Wolfberry	<u>Lycium spp.</u>
Wright's silk-tassel	<u>Garrya wrightii</u>
<u>Trees</u>	
Alligator juniper	<u>Juniperus deppeana</u>
Cottonwood	<u>Populus wislizenii</u>
One-seed juniper	<u>Juniperus monosperma</u>
Pinon pine	<u>Pinus edulis</u>
Ponderosa pine	<u>Pinus ponderosa</u>
<u>Forbs</u>	
Aster	<u>Aster spp.</u>
Buckwheat	<u>Eriogonum spp.</u>

Appendix 3. Common and Scientific Names of Mammals mentioned in Letter.

Common Name	Scientific Name
Aberts Squirrel	<u>Sciurus aberti</u>
Badger	<u>Taxidea taxus</u>
Banner-tailed kangaroo rat	<u>Dipodomys spectabilis</u>
Black-tailed jackrabbit	<u>Lepus californicus</u>
Bobcat	<u>Lynx rufus</u>
Brush mouse	<u>Peromyscus boylii</u>
Cliff chipmunk	<u>Eutamias dorsalis</u>
Coyote	<u>Canis latrans</u>
Deer mouse	<u>Peromyscus maniculatus</u>
Desert cottontail	<u>Sylvilagus auduboni</u>
Gray fox	<u>Urocyon cinereoargenteus</u>
Hispid pocket mouse	<u>Perognathus hispidus</u>
Kit fox	<u>Vulpes macrotis</u>
Merriams kangaroo rat	<u>Dipodomys merriami</u>
Mountain lion	<u>Felis concolor</u>
Mule deer	<u>Odocoileus hemionus</u>
Ords kangaroo rat	<u>Dipodomys ordii</u>
Pinon mouse	<u>Peromyscus truei</u>
Plains harvest mouse	<u>Reithrodontomys montanus</u>
Plains pocket mouse	<u>Perognathus flavescens</u>
Porcupine	<u>Erethizon dorsatum</u>
Pronghorn	<u>Antilocapra americana</u>
Raccoon	<u>Procyon lotor</u>
Silky pocket mouse	<u>Perognathus flavus</u>
Southern grasshopper mouse	<u>Onychomys torridus</u>
Spotted ground squirrel	<u>Spermophilus spilosoma</u>
Swift fox	<u>Vulpes velox</u>
Western harvest mouse	<u>Reithrodontomys megalotis</u>
White-footed mouse	<u>Peromyscus leucopus</u>
White-throated woodrat	<u>Neotoma albigula</u>

Appendix 4. Common and Scientific Names of Birds mentioned in Letter.

Common Name	Scientific Name
American kestrel	<u>Falco sparverius</u>
American robin	<u>Turdus migratorius</u>
Ash-throated flycatcher	<u>Myiarchus cinerascens</u>
Barn swallow	<u>Hirundo rustica</u>
Black phoebe	<u>Sayornis nigricans</u>
Black-throated sparrow	<u>Amphispiza bilineata</u>
Blue grosbeak	<u>Guiraca caerulea</u>
Bridled titmouse	<u>Parus wollweberi</u>
Brown-headed cowbird	<u>Molothrus ater</u>
Brown thrasher	<u>Toxostoma rufum</u>
Cliff swallow	<u>Petrochelidon pyrrhonota</u>
Common bushtit	<u>Psaltiriparus minimus</u>
Common raven	<u>Corvus corax</u>
Common yellowthroat	<u>Geothlypis trichas</u>
Crissal thrasher	<u>Toxostoma dorsale</u>
Double-crested cormorant	<u>Phalacrocorax auritus</u>
Gambel quail	<u>Lophortyx gambelii</u>
Gray catbird	<u>Dumetella carolinensis</u>
Great-tailed grackle	<u>Quiscalus mexicanus</u>
Green heron	<u>Butorides striatus</u>
Hairy woodpecker	<u>Picoides villosus</u>
Horned lark	<u>Eremophila alpestris</u>
House finch	<u>Carpodacus mexicanus</u>
House sparrow	<u>Passer domesticus</u>
Hummingbird	<u>Trochilidae</u>
Killdeer	<u>Charadrius vociferus</u>
Lark bunting	<u>Calamospiza melanocorys</u>
Lark sparrow	<u>Chondestes grammacus</u>
Lesser goldfinch	<u>Carduelis psaltria</u>
Lesser nighthawk	<u>Chordeiles acutipennis</u>
Loggerhead shrike	<u>Lanius ludovicianus</u>
Mountain chickadee	<u>Parus gambelii</u>
Mourning dove	<u>Zenaida macroura</u>
Northern mockingbird	<u>Mimus polyglottos</u>
Northern oriole	<u>Icterus galbula</u>
Phainopepla	<u>Phainopepla nitens</u>
Pinon jay	<u>Gymnorhinus cyanocephalus</u>
Red-winged blackbird	<u>Agelaius phoeniceus</u>
Rock dove	<u>Columba livia</u>
Rough-winged swallow	<u>Stelgidopteryx ruficollis</u>
Rufous-sided towhee	<u>Pipilo erythrophthalmus</u>
Say phoebe	<u>Sayornis saya</u>
Scaled quail	<u>Callipepla squamata</u>
Starling	<u>Sturnus vulgaris</u>
Turkey vulture	<u>Cathartes aura</u>
Violet-green swallow	<u>Tachycineta thalassina</u>
Western kingbird	<u>Tyrannus verticalis</u>
Western tanager	<u>Piranga ludoviciana</u>
White-throated swift	<u>Aeronautes saxatalis</u>
White-winged dove	<u>Zenaida asiatica</u>
Yellow-billed cuckoo	<u>Coccyzus americanus</u>
Yellow-breasted chat	<u>Icteria virens</u>
Yellow-headed blackbird	<u>Xanthocephalus xanthocephalus</u>

Appendix 5. Common and Scientific Names of Reptiles mentioned in Letter.

Common Name	Scientific Name
Checkered whiptail lizard	<u>Cnemidophorus tesselatus</u>
Clark spiny lizard	<u>Sceloporus clarki</u>
Collared lizard	<u>Crotaphytus collaris</u>
Crevise spiny lizard	<u>Sceloporus poinsetti</u>
Desert grassland whiptail lizard	<u>Cnemidophorus uniparens</u>
Greater earless lizard	<u>Cophosaurus texanus</u>
Leopard lizard	<u>Crotaphytus wislizenii</u>
Lesser earless lizard	<u>Holbrookia maculata</u>
Roundtail horned lizard	<u>Phrynosoma modestum</u>
Side-blotched lizard	<u>Uta stansburiana</u>
Tree lizard	<u>Urosaurus ornatus</u>

Appendix 6. Common and Scientific Names of Fish mentioned in Letter.

<u>Common Name</u>	<u>Scientific Name</u>
Black bullhead	<u>Ictalurus melas</u>
Black crappie	<u>Pomoxis nigromaculatus</u>
Blue catfish	<u>Ictalurus furcatus</u>
Bluegill	<u>Lepomis macrochirus</u>
Bullhead minnow	<u>Pimephales vigilax</u>
Carp	<u>Cyprinus carpio</u>
Channel catfish	<u>Ictalurus punctatus</u>
Fathead minnow	<u>Pimephales promelas</u>
Flathead catfish	<u>Pylodictis olivaris</u>
Gizzard shad	<u>Dorosoma cepedianum</u>
Goldfish	<u>Carassius auratus</u>
Green sunfish	<u>Lepomis cyanellus</u>
Largemouth bass	<u>Micropterus salmoides</u>
Longear sunfish	<u>Lepomis megalotis</u>
Longfin dace	<u>Agosia chrysogaster</u>
Mosquitofish	<u>Gambusia affinis</u>
Northern pike	<u>Esox lucius</u>
Rainbow trout	<u>Salmo gairdneri</u>
Red shiner	<u>Notropis lutrensis</u>
River carpsucker	<u>Carpiodes carpio</u>
Smallmouth bass	<u>Micropterus dolomieu</u>
Smallmouth buffalo	<u>Ictiobus bubalus</u>
Striped bass	<u>Morone saxatilis</u>
Threadfin shad	<u>Dorosoma petenense</u>
Walleye	<u>Stizostedion vitreum vitreum</u>
Warmouth	<u>Lepomis gulosus</u>
White bass	<u>Morone chrysops</u>
White crappie	<u>Pomoxis annularis</u>
White sucker	<u>Catostomus commersoni</u>
Yellow bullhead	<u>Ictalurus natalis</u>
Yellow perch	<u>Perca flavescens</u>
